

## 2068/SPECTRUM 32K EPROM version C

### UNPACKING

Your eprom is inserted in a black foam carrier; leave it there til you install it. NOTE: there are two diodes inserted on the reverse side of the foam; be careful not to loose them.

### INSTALLATION

You will find a full-scale drawing of the inside of the 2068 which shows where the eprom, switch and diodes are to be installed. The eight installation steps are above the drawing. The order in which they are performed is not crucial.

The INSTALLATION NOTES give more details about each step.

### TOOLS REQUIRED:

- 1) A low-power (15-watt) soldering iron, preferably grounded.
- 2) Solder sucker... optional.
- 3) Rosin-core solder.
- 4) A drill, preferably battery-operated with low-speed option.
- 5) 3/32" drill bit.
- 6) 1/4" drill bit.
- 7) Exacto knife.
- 8) Medium phillips and small flat-head screwdrivers.

### OPERATION

After installation, you simply set the switch to one position or the other, for operation of the computer as a 2068 or Spectrum. You might wish to mark the switch. Note: do not move the switch when the computer is on; doing so will cause a crash.

Note: in 2068 operation, the DELETE command (used for deleting BASIC lines) is now accessed via Symbol-Shift + 0 when the cursor is a flashing K. The editing DELETE control remains Caps-Shift + 0, and now works fast, as with Spectrum.

### THEORY

The switch selects the upper or lower half of the 32K eprom. The lower half contains the corrected 2068 ROM code, and the upper half contains the corrected Spectrum ROM code.

### IDENTIFICATION

The 32K eprom is marked thus: txspC  
ck 2659

That means: Timex and Spectrum Roms Version C  
Checksum is hex 2659 by the Orrfelt method.

## 2068/SPECTRUM 32K EPROM ERROR CORRECTIONS

### 1. DELETE (2068 only) by Jack Dohany

The delete CONTROL and COMMAND originally used the same code (12), which caused various problems. The delete COMMAND has been separated, and uses code 31, produced by SS+0 in K-mode.

The delete CONTROL remains code 12, produced by CS+0 in all modes.

### 2. CURSOR LEFT (Spectrum only) by Dr. Ian Logan

The cursor-left function worked improperly on the top screen line. The standard 2068 ROM has this fix.

### 3. SCREEN\$ (Spectrum Only) by Dr. Ian Logan

The SCREEN\$ function worked improperly in some situations.

The standard 2068 ROM has this fix.

### 4. ROUND-UP (Spectrum only) by Dr. Ian Logan

Without this fix, PRINT 1/2-.5 yields 2.3283064E-10, an error.

With this fix, PRINT 1/2-.5 yields 0, which is correct.

### 5. INT-65536 by Bob Orrfelt, as suggested by Dr. Ian Logan.

This fix is implemented in both ROMs.

Without this fix, PRINT INT -65536 yields -1, an error.

With this fix, PRINT INT -65536 yields -65536, correctly.

Note: the NMI error is NOT corrected in this eprom, since that would adversely affect the operation of some 2068 disk systems.

This error has no effect in normal operation.

## \*\*\*\* INSTALLATION NOTES \*\*\*

### 1) REMOVE KEYBOARD

Turn computer over, remove 7 phillps screws, put in jar cap.

Turn computer over, lift front, CAREFULLY remove keyboard cable. Set keyboard aside, resting on keys.

### 2) REMOVE ROM

The ROM is usually labeled 8336A. It is located just below the L-shaped upside-down circuit board. If you don't have an IC removal instrument, use a small screwdriver to pry the rom up at the corners, gently, a little at a time. KEEP the ROM as a spare part.

### 3. REMOVE JUMPERS W1 and W2

These usually look like gray resistors with a black ring in the center. They are just below the large square ULA chip, to the left of the ROM. You can simply cut them away, but it would be neater to unsolder them, and clear the holes of solder with a solder-sucker. You will see two white horizontal lines labeled W1 and W2, and two diagonal white lines forming an X, labeled W3 and W4.

4. INSTALL DIODES AS SHOWN, IN PLACE OF JUMPERS.

The anodes of the diodes are soldered in the two LEFT holes. The single wire connected to the cathodes (black ring end) of both diodes is soldered in the UPPER RIGHT hole. The lower right hole is left empty.

5. INSTALL 32K EPROM, WITH SWITCH CABLE TOWARD REAR

It is very important that the eprom be oriented correctly, with Pin 1 toward the rear of the computer. Be sure that all pins are positioned correctly in the socket before applying pressure. Don't bend any pins; but if you do, straighten them and try again, even more carefully.

6. INSTALL SWITCH ON RIGHT SIDE, AT RIGHT OF JOYSTICK PORT

I usually do this without removing the 2068 circuit board, but you may wish to remove it from the lower case before drilling holes.

I suggest drilling 4 holes with 3/32" bit. First mark the holes on a label, exactly 1/4" apart, on a straight line. The outside marks should be 3/4" apart. Then put the label on the outside of the case, centering the hole marks horizontally between the joystick port, and the rear of the computer. Before drilling, make small dents at the marks, using an awl or ice-pick or nail. After drilling the four 3/32" holes, enlarge the two center holes at slow speed with a 1/4" bit. Then trim with an Exacto knife to make a rectangular hole for the switch handle.

After the holes are made, install the switch, using a small flat-head screwdriver.

DO NOT get lazy and leave the switch dangling outside the computer. The switch carries +5V and ground on the two outer terminals. If the switch is left dangling, a short-circuit could result.

INSTALLATION IS NOW COMPLETE.

7. TEST WITH KEYBOARD OFF

The copyright notices should appear. If they don't, turn off, and check EPROM and DIODE installation. Look for bent eprom pins, or pins that are outside the socket. When copyright notices appear, turn off and proceed to last step.

8. REPLACE KEYBOARD

Be very careful when connecting the keyboard cable to the computer.

\*\*\* END \*\*\*

## 2068/SPECTRUM 32K EPROM INSTALLATION

(Also see INSTALLATION NOTES.)

1. Remove keyboard.
2. Remove ROM.
3. Remove gray jumpers W1 and W2.
4. Install diodes as shown, in place of jumpers.
5. Install 32K Eprom, with switch cable toward rear.
6. Install switch on right side, at right of joystick port.
7. Test with keyboard off and no interfaces attached.
8. Replace keyboard.

